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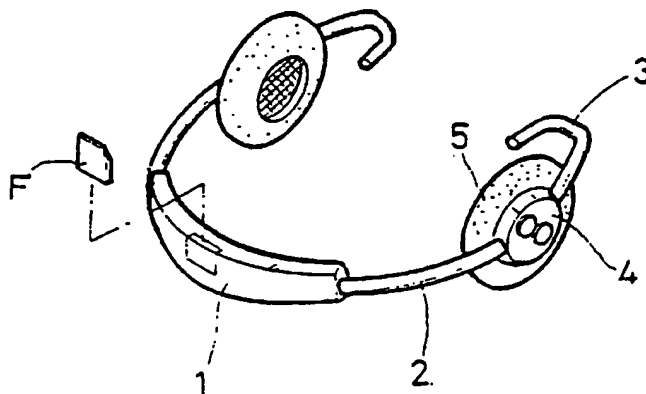
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(54) Title: **PORTABLE AUDIO PLAYER**



(57) Abstract: Disclosed is a portable audio player suitable to be used for an MP3 player and/or an FM receiver. A main body of the portable audio player is disposed in rear of the neck of a user, and two arms are extended. Ear phones are supported by ear hooks hung over the ears of the user without troublesome signal transmission lines so that simplified portability and utility of the audio player may be provided.

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# PORTABLE AUDIO PLAYER

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

5       The present invention relates to a portable audio player, and more particularly to a portable audio player suitable to be adapted to an MP3 player.

### 2. Description of the Prior Art

Diverse forms of audio data is used together with a rapid progress of computer music according to a computer popularization and spreading communications.

10       Such audio data is mainly classified into sampling data obtained from sampling of an audio signal itself and sound source data using separate sound sources.

First of all, since the sound-using data is constructed with consecutive control signals for controlling sound sources such as separately structured FM sound sources, MIDI sound sources, or the like, the sound source data is not actual audio data, but widely used with an advantage that  
15 its size can be greatly reduced.

Some examples of sound source data formats may be ROL using an FM sound source, IMS, OKA, and the like using the ROL, MID using an MIDI sound source, WRK or SNG of its dedicated standards, or OKM, NOB, ST3, and so on using the standards.

By the way, it is impossible for actual voice data such as a recorded song of a particular  
20 singer itself, songs in a concert, or the like to be converted into data since the sound source data is a consecutive control signal of a sound source, the sound source data is used in programs for singing rooms and the like.

In the meantime, sampling data is obtained from digitalizing an analog voice signal at a predetermined sampling speed and are used with formats of VOC in the DOS environment, WAV  
25 in the IBM windows environment, AIF in the MAC environment. The sound quality is very highly excellent, but the size of the data is very large so that the sampling data is limited to short

effect sounds.

Therefore, sound compression technologies have been developed for compressing sampling data. The simplest compression technology reduces the number of bits upon digitalizing a sound or reduce a sampling speed.

5 RA, which is used for internet broadcasting and the like, may be taken as an example of using such compression method. The RA uses a low class bit of 4 bits or 5 bits to minimize a data size so that a real time transmission is realized but a sound quality may not be guaranteed. In addition to it, there is the ADPCM(Adaptive Delta Pulse Code Modulation) as a format having a relatively excellent compression rate. However, it has not an enough compression rate yet in  
10 being widely used in diverse media.

Accordingly, various researches are progressed for enhancing the compression rate while preventing a deterioration of a sound quality, and the most successful is the MPEG format.

The MPEG format uses a perceptual coding method and enables audio or video signals to be compressed at a high compression rate without a deterioration of a sound and a video  
15 quality by removing weak signals behind strong signals.

In particular, the MPEG layer 3, which is used in recent and is generally called MP3, provides a high quality sound and a high compression rate enough to contain eight-hour-long audio data in a CD-ROM with nearly the same sound quality as the original sound.

Therefore, the MP3 is explosively used as a data format for popular songs and the like  
20 including an actual voice of a singer in a concert in recent computer and communication fields.

The biggest reason in obtaining such popularity is that the MP3 enables users to freely collect and use only songs he wants and provides an excellent quality almost approaching to an original sound.

The MP3 has a high possibility in occupying a major part of the music disk market when  
25 considering its popularity, so a paid distribution of MP3-formatted songs is introduced and, in recent, MP3 players designed to reproduce MP3-formatted songs appear.

FIG. 1 is a view for schematically showing an MP3 player designed to reproduce MP3-formatted files.

As shown in FIG. 1, an MP3 player controlled by a microprocessor 200 is provided with a parallel interface 260 for communicating with a computer PC and a serial interface 270 for communicating with a flash memory F, and MP3-formatted files transmitted from the computer PC is stored in and taken out of the flash memory F.

The MP3 files taken out of the flash memory F is decoded, that is, decompressed in an MP3 decoder 210 and then reproduced to an output part 230 such as a headphone and the like through a D/A converter 220.

In the meantime, the MP3 players may be used for recording and reproducing voices. A voice inputted through a microphone 290 is digitized in an A/D converter 280, transmitted to an APPCM encoder 212 through a serial interface 270, and then encoded to be stored in the flash memory F in a compressed state. The compressed voice is reversely decompressed in an ADPCM decoder 211 to be reproduced.

In the meantime, keys 250, a display device LCD, and a control part 240 are provided to control the MP3 players.

Here, if an MP3 player is not portable, the output part 230 is equipped with an amplification part and a speaker, but, if portable, the output part 230 of the MP3 player is equipped with a headphone in general.

In recent, a neck phone appears as shown in FIG. 2 since a headphone spoils hair styles such as permanent waves and the like.

A neck phone as shown in FIG. 2 includes arms 12 extended in a U shape along the back of the neck of a user, ear hooks 13 hung on the ears of a user at both ends of the arms 12, ear phones 14 attached on the front ends of the ear hooks 13, and pads 15.

A Japanese patent application is pending at present on behalf of the Sony corporation Co., Ltd. of Japan with respect to the above structure.

However, such neck phone is provided separately from a main body, so a user carries the main body in a hand or around his waist. Therefore, long signal transmission lines should be extended from the main body to the actual neck phone.

5 The lines cause an inconvenience for a user to carry out activities such as cycling, jogging, or the like, so that the neck phone has the same problem as a conventional headphone in bearing and using the same except for spoiling hair styles.

### **SUMMARY OF THE INVENTION**

Accordingly, it is an object of the present invention to provide an audio player extremely convenient in bearing and using the same without troublesome signal transmission lines.

10 In order to achieve the above object, an audio player according to the present invention comprises a main body disposed on the rear of the neck of a user; arms extended toward the ears of the user from the main body; ear phones disposed on the front ends of the arms and contacted with the ears of the user; and ear hooks hung on the ears of the user for the ear phones to be kept on the ears.

15 According to a characteristic of the present invention, an MP3 reproduction part and/or an FM reception part are embedded in the main body. According to another characteristic of the present invention, ear hooks are each extended in a 7-lettered shape in an internal and upward direction from the ear phones to be hung on the upper portions of the ears from the front to rear.

20 With such a structure as stated above, since the main body of the audio player is placed in the rear of the ears and the transmission lines are built in or attached on the arms, the portable audio player may become compacted without hindering user's activities.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

25 The above object and other advantages of the present invention will become more apparent by describing in detail a preferred embodiment thereof with reference to the attached drawings, in which:

FIG. 1 is a block diagram for showing a general structure of an MP3 player;

FIG. 2 is a side view of showing a main portion of a neck phone used for a conventional audio player;

FIG. 3 is a perspective view for showing a structure of an audio player according to an embodiment of the present invention;

5        FIG. 4 is a side view for showing a main portion of a neck phone according to an embodiment of the present invention;

FIGs 5(A) and 5(B) are a side view and a plain view for showing wearing states of the audio player of FIG. 3, respectively;

FIG. 6 is a block diagram for showing the audio player of the FIG. 3;

10       FIG. 7 is a perspective view for showing a structure of a writer capable of being used for data inputs to the audio player of FIG. 3; and

FIGs. 8(A) and 8(B) are side views for showing both sides of the neck phone as an embodiment of a key structure of the audio player of FIG. 3.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

15       Hereinafter, concrete characteristics and advantages of the present invention will become more apparent with a detailed description of a preferred embodiment with reference to the accompanying drawings.

FIG. 3 is a perspective view for showing a structure of an audio player according to an embodiment of the present invention. As shown in FIG. 3, an audio player according to an  
20       embodiment of the present invention is provided with a main body 1 disposed on the rear of the neck of a user and two arms 2 extended from the main body 1 to two earphones 4 placed on ears of the user. The earphones 4 has pads 5 covering the ears and ear hooks 3 hung on the ears.

Signal transmission lines connecting the main body 1 and the earphones 4 are built in or attached to the arms 2, so the audio player according to an embodiment of the present invention  
25       has a very compact structure without troublesome lines.

A disadvantage of the audio player according to the present invention is that the main

body 1 is disposed on the rear of the neck of a user so that its weight is supported in a state contacted with the user's skin.

Accordingly, the audio player according to the present invention has difficulties in being used as an audio player having mechanical parts such as a cassette deck and the like which are heavy as can be seen in a cassette tape player and so on, but is suitable for an audio player having only chip-shaped electronic components as can be seen in a radio, an MP3 player, or the like. In the embodiment as seen in FIG. 3 and so on, an audio player is structured as a reproduction-dedicated MP3 player using a flash memory F in which MP3-formatted files are stored, and, preferably, further comprises an FM receiver.

Another problem occurring from a contact of the main body 1 to the skin of the neck is that sweat is easily penetrated into the main body 1. The sweat is a corrosive liquid containing a saline matter so that the sweat causes a damage to electronic components easily. In order to prevent the damage, it is preferable to seal with a rubber gasket and vinyl waterproof cloth and the like a portion of the case of the main body 1 with which the neck of a user is contacted.

In the meantime, in order to prevent an unpleasant feeling occurring from a contact of a user to the main body 1 during the user's sweating, it is preferable that a suitable absorptive pad such as velcro(a brand name) and so on is replaceable attached on a neck-touching portion of the main body 1.

In the meantime, not separately shown, but a structure may be adopted that the arms 2 become bent with respect to the main body 1 or the lengths of the arms 2 vary for the sake of convenient keeping.

FIG. 4 is a side view for showing a main portion of a neck phone 4 according to an embodiment of the present invention. As shown in FIG. 4, the ear hooks 3, different from a conventional structure of FIG. 2, is upwardly extended through the interior of the ear phones 4 in a 7-lettered shape to be hooked from the front to rear.

In the ear hooks 13 of FIG. 2, the arms 12 are contacted with the rear portions of ears to

cause skin diseases and the like when using the arms 12 for a long time, whereas, in the ear hooks 3 according to an embodiment of the present invention, only the front ends of the ear hooks 3 are contacted with the upper portions of ears as in eye glasses, so that particular problems are not caused since contact areas or contact pressures become less.

5           FIGs 5(A) and 5(B) are a side view and a plain view for showing wearing states of the audio player of FIG. 3, respectively. As shown in FIGs. 5(A) and 5(B), since the main body 1 is contacted with the rear portion of the neck to be supported in a state that the ear hooks 3 are hung on the ears of a user, the load due to the main body 1 is dispersed for the user not to feel much weight compared to a simple neck phone.

10           In the meantime, necessary keys 6 such as a push button and the like for controlling the audio player should be found only with a sensation of feeling in user's hands since the main body 1 is positioned in the rear of the neck.

            According to this, it is preferable for the keys 6 to be disposed on both sides of the main body 1 or to be provided on the ear phones 4 as shown in FIGs. 5(A) and 5(B). The structure  
15           therefor will be in detail described later through FIG. 8.

            FIG. 6 is a block diagram for showing the audio player of the FIG. 3.

            As shown in FIG. 6, MP3 files stored in the flash memory F are decoded through the MP3 decoder 110 under the control of the microprocessor 100 and then outputted to the output part 130 through the D/A converter 120, so that the structure becomes extremely simplified compared to  
20           a conventional MP3 player shown in FIG. 1 to reduce the cost. Remaining reference numbers 150 and 140 denotes keys and a key input/output part, respectively.

            The audio player according to an embodiment of the present invention does not have a separate interface so that MP3 files should be stored in the flash memory F in advance through a separate device. Therefore, a writer is indicated in FIG. 7.

25           The writer is a flash memory writer which may be found in the market. An interface E is provided with a cable L and a connector N to be connected to a parallel port K and so on of a



computer C, so that MP3 files stored in the computer C may be written to the flash memory F.

FIGs. 8(A) and 8(B) are side views for showing both sides of the neck phone as an embodiment of a key structure of the audio player of FIG. 3.

FIGs. 8(A) and 8(b) show a right and a left ear phone 4, respectively.

5 As stated above, a user should find a desired key 6 through only a sense of his hands, so that it is appropriate the number of keys 6 for the both ear phones 4 is at most not more than 2.

However, keys required for a general MP3 player are ON/OFF, PLAY, FF, STOP, REW, FR, volume, and so on, so that it is preferable for the keys 6 of the audio player according to an embodiment of the present invention to have the minimum number of keys with compatible  
10 functions.

For example, the right ear phone 4 as in FIG. 8(A) is provided with a play key 6a and a stop key 6b, and the play key 6a may be functioned as PLAY when it is pressed once and as FF when it is pressed twice while the stop key 6b may be functioned as STOP when the audio player is in the state of PLAY and as ON/OFF when the audio player is in the state of STOP.

15 In the meantime, the left ear phone 4 as shown in FIG. 8(B) may be provided with a volume key 6c and an FM key 6d in case that an FM receiver is built in, to thereby sequentially select predetermined broadcasting stations in the FM receiver one by one every time the FM key 6d is pressed upon turning-on by the stop key 6b.

In the meantime, the volume key 6c steps up or down, in a digital control manner, the  
20 volume by a predetermined step every time it is pressed once. To step down the volume, any one of the keys 6a, 6b, and 6d is set to a shift key. For example, it may be considered that the volume is stepped down if the stop key 6b and the volume key 6c are pressed at the same time.

As stated above, a portable audio player according to an embodiment of the present invention provides users with extremely simplified portability and utility, together with a  
25 conversion function of an FM receiver and an MP3 player.

## CLAIMS

1. A portable audio player, comprising:  
a main body disposed on the rear of the neck of a user;  
ear phones disposed on the both ends of the main body and contacted with the ears of the  
5 user; and  
ear hooks hung on the ears of the user for the ear phones to be kept on the ears.
2. A portable audio player, comprising:  
a main body disposed on the rear of the neck of a user;  
arms extended toward the ears of the user from the main body;  
10 ear phones disposed on the front ends of the arms and contacted with the ears of the user;  
and  
ear hooks hung on the ears of the user for the ear phones to be kept on the ears.
3. The portable audio player as claimed in claim 1, wherein the main body is provided  
with an MP3-dedicated player.
- 15 4. The portable audio player as claimed in claim 2, wherein the main body is provided  
with an MP3-dedicated player.
5. The portable audio player as claimed in claim 1, wherein the main body is further  
provided with an FM receiver.
6. The portable audio player as claimed in claim 2, wherein the main body is further  
20 provided with an FM receiver.
7. The portable audio player as claimed in claim 1, wherein the ear hooks are upwardly  
extended in a 7-lettered shape through the interior of the ear phones and hung from the front to  
rear on upper portions of the ears.
8. The portable audio player as claimed in claim 2, wherein the ear hooks are upwardly  
25 extended in a 7-lettered shape through the interior of the ear phones and hung from the front to  
rear on upper portions of the ears.

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FIG. 1

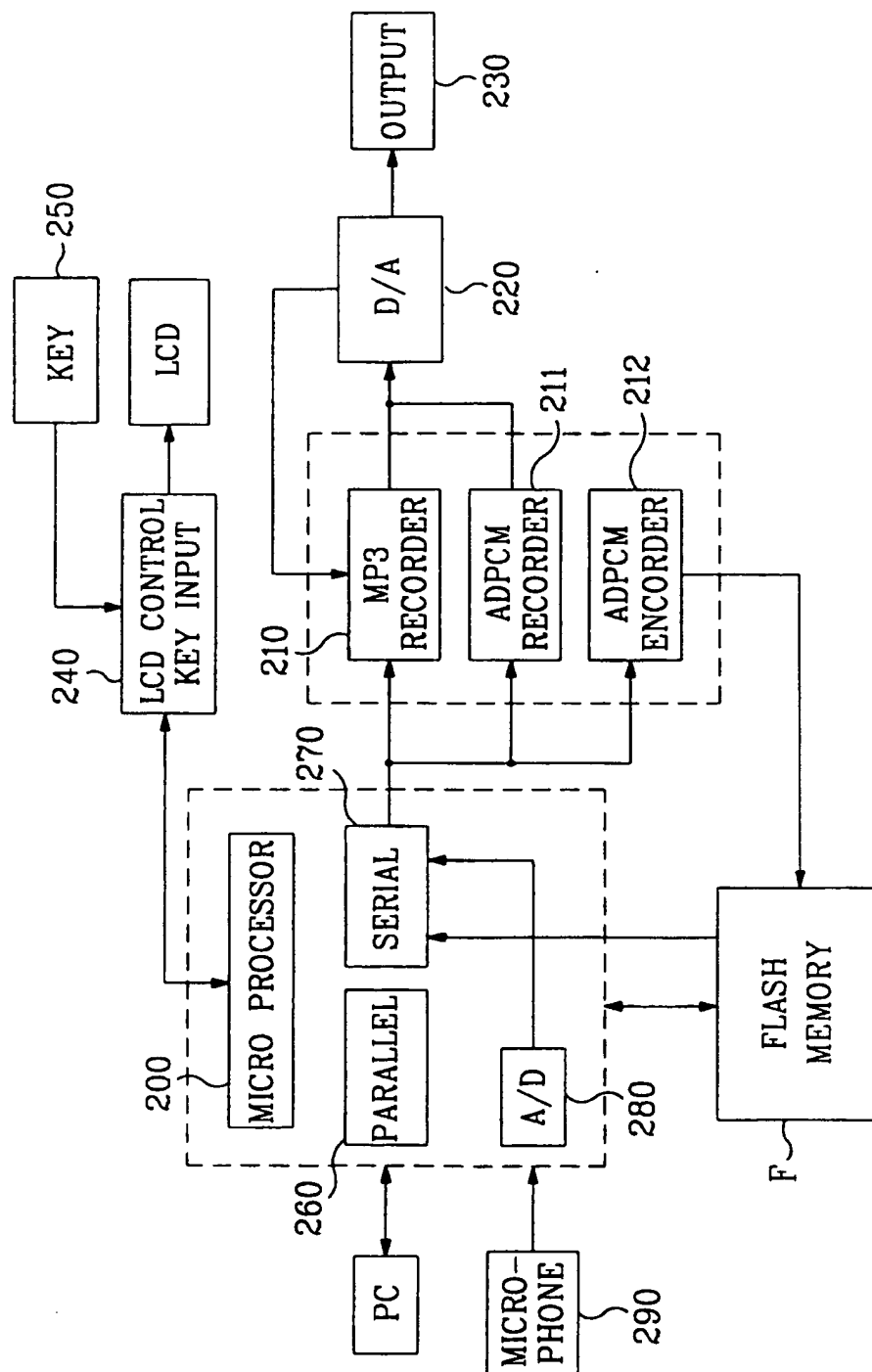


FIG. 2

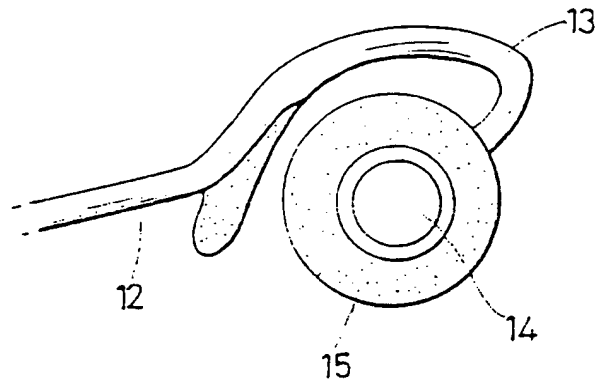
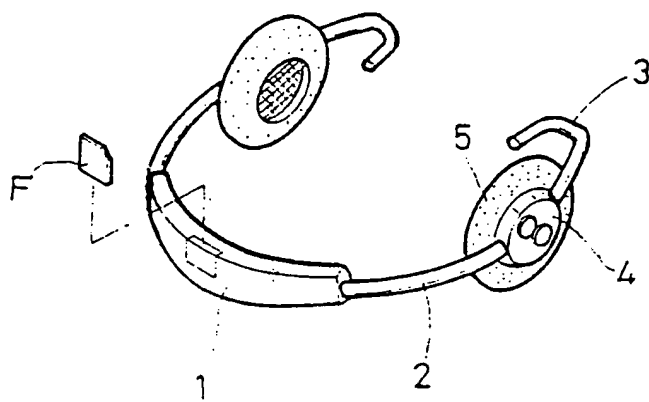


FIG. 3



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FIG. 4

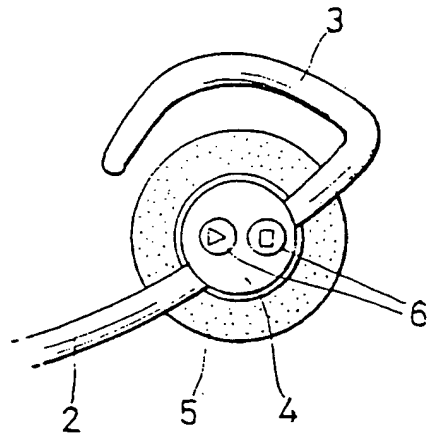


FIG. 5A

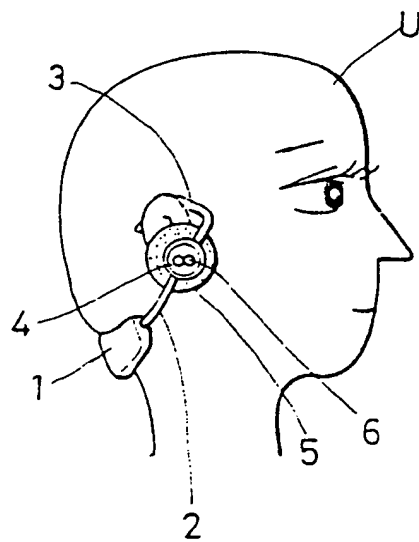
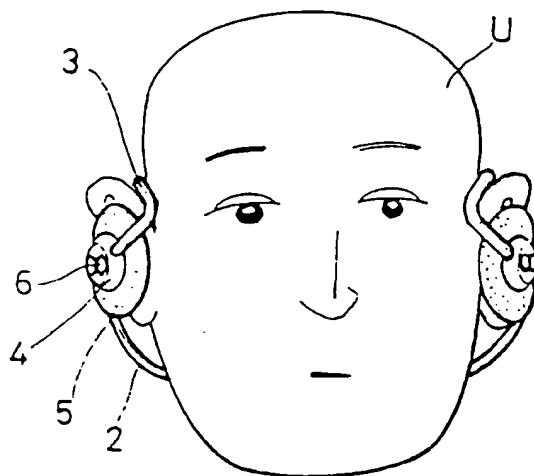


FIG. 5B



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FIG. 6

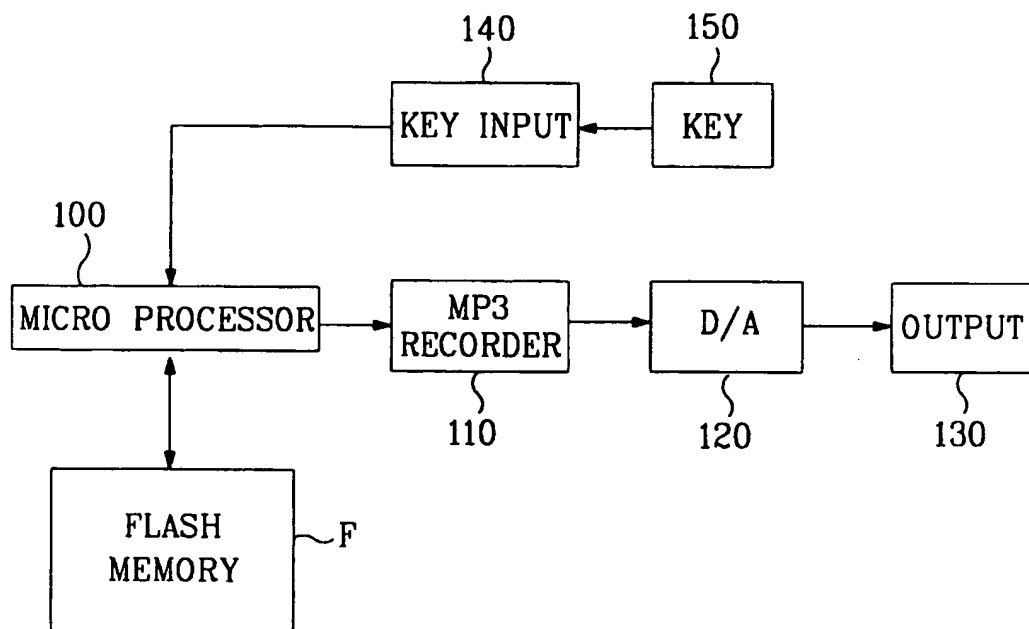


FIG. 7

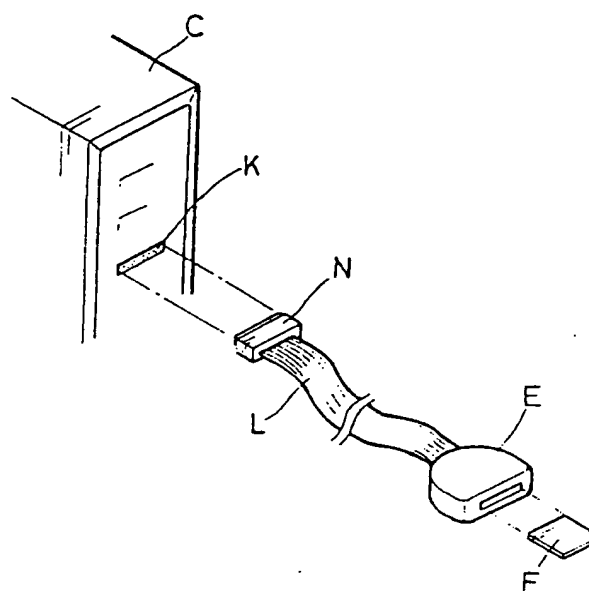




FIG. 8A

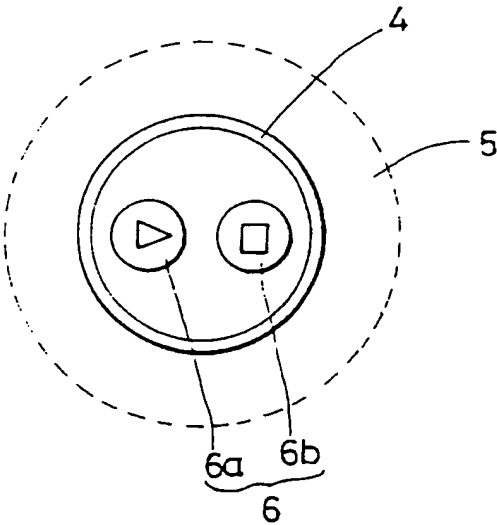
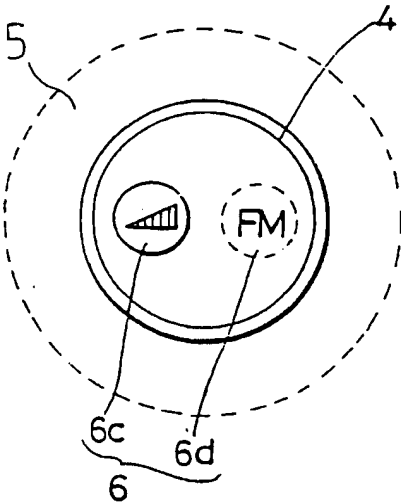


FIG. 8B



## INTERNATI NAL SEARCH REPORT

International application No.

PCT/KR00/00575

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 G11B 20/00**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H04B1/08 H04R1/10 H04B1/44 H04M1/05 H04B7/15 A61B1/22 H04B1/38 G10L9/18 G06F3/16

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KOREAN PATENTS AND APPLICATIONS FOR INVENTIONS SINCE 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, PAJ "HEADPHONE""HEADSET""EARPHONE""RADIO""AUDIO""PORTABLE"

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 86-12563 (DO, DONG-KYU) 10 OCTOBER 1986, whole document	5, 6
X	KR 92-8646 (YANG, YOUNG-SUK) 20 MAY 1992, whole document	5, 6
X	KR 84-1495 (PARK, JU-RAK) 30 APRIL 1984, whole document	5, 6
P,X	KR 00-0012814 (CHOI, DONG-SOO) 6 MARCH 2000, Claim 1-4, whole document	1-8
Y	US 4,017,797 A (JOHN D. LAESSIG) 12 APRIL 1977, Claim 1-4	1, 2
Y	US 4,654,883 (KEISUKE IWATA) 31 MARCH 1987, Claim 4, 8, 11	1, 2, 5-8
A	JP 11-175099 (SAEHAN INFO.CO.) 2 JULY 1999, whole document	1-4



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

08 NOVEMBER 2000 (08.11.2000)

Date of mailing of the international search report

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